DOCUMENTATION OF REVIEW FINDINGS

Hocking River Basin, Ohio
Monday Creek Sub-basin
Ecosystem Restoration Project

FINAL FEASIBILITY REPORT
AND ENVIRONMENTAL ASSESSMENT

NOVEMBER 2005

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1. Background.

a. Authority. Recognizing the concerns of Federal and state agencies, local officials, and individuals, the U.S. House of Representatives Committee on Transportation and Infrastructure adopted a resolution in March 1996, requesting the Secretary of the Army "to review the report of the Chief of Engineers on the Ohio River and Tributaries, published as House Document 306, 74th Congress, First Session, and other pertinent reports, to,

> "*…determine whether modifications are warranted to solve a variety of water and related resource problems in the Hocking River Basin with priority given to Sunday and Monday Creek sub-basins. Special emphasis shall be given to the need for environmental restoration of lands and waters that have been impacted by resource extraction and other land uses. This study is to be conducted in consultation with the Hocking Conservancy District."*

b. Study Purpose Species diversity and abundance have been identified as problems in the aquatic and terrestrial ecosystems of the Monday Creek watershed. Pollution tolerant fish and macroinvertebrate species are dominant in the ecosystem and generally found in the mainstems of Monday Creek and Snow Fork. Pollution sensitive species such as bass and darters and stoneflies and caddisflies, are found only in small areas which are disconnected both laterally and longitudinally from the rest of the watershed. Because of the lack of biodiversity, the aquatic and terrestrial habitats are not as complex as a self sustaining ecosystem.

The goal of this project is to: 1) sufficiently restore the structural and functional components of the ecosystem to a less degraded state downstream of acid mine drainage discharges, and 2) minimize water infiltration into the existing abandoned mine complexes. The restoration objective is to restore the Monday Creek ecosystem to self-sustaining conditions generally consistent with a functioning ecosystem designated as Warm Water Habitat by the Ohio Environmental Protection Agency.

Structural degradation of the ecosystem results from the deposition of dissolved and suspended acid mine drainage constituents in stream waters. Concentrations of iron and aluminum occur at levels toxic to aquatic species; and abnormal pH and acidity levels adversely affect vertebrate and invertebrate life. Suspended sediments deposited on the

streambed may harden or cover existing coarse substrates, negatively affecting substrate dependent aquatic species. The functional characteristics of the ecosystem are impaired through removal of most of its biotic components, which affects adjacent riparian and upland areas as well.

c. Plan formulation. A plan formulation rationale to determine the best measures to utilize in the watershed was performed by the study team. The chemical interactions between iron, pH, acidity, aluminum, stream flow and dissolved oxygen are complex and concentrations vary from site to site. These constituents are the critical factors in choosing a suitable restoration method at a site. The development of the Monday Creek Total Acid Mine Drainage Loading (TAMDL) model was a cooperative effort between the U.S. Army Corps of Engineers (USACE), Huntington District and West Virginia University (WVU). This model was used to simulate the required load reductions of metals and acidity from each of the Monday Creek and Snow Fork subwatersheds necessary to satisfy fish and macroinvertebrates species survival requirements. Design of alternative restoration plans for each locale were developed and simulated in the TAMDL model. The plans were then adjusted until pH, aluminum and iron remediation thresholds were met. Peer review and technical competency of the model was performed by Ohio University and Ohio Environmental Projection Agency prior to implementation of EC 1105-2-407, *Planning Models Improvement Program: Model Certification.* It is believed that this effort would meet the spirit and intent of the referenced guidance.

Subsidence alternatives were developed for four areas identified in the field reconnaissance survey and selections were based on the physical characteristics of the subsided areas. The ultimate goal was to minimize the volume of water entering the underground mine workings, thus reducing a key source of acid mine drainage in the watershed.

A total of 19 cost-effective plans were developed to address the project purpose. These 19 plans were evaluated using the CE/ICA process, and seven were identified as Best Buy plans. Details of the plan formulation process are found in section 4 of the final report.

d. Study recommendations. Plan Combination 6 would address undesirable features such as dissipating streams, stream blockages and subsidences to prevent surface water from flowing into underground mine workings, thus preventing the generation of AMD within the Monday Creek watershed. Acid mine drainage remediation sites would best contribute to the objective of restoring the Monday Creek ecosystem by preventing surface water from entering the mines. These sites would also dilute surface flows, which would allow existing pockets of diverse fish and macroinvertebrate populations to repopulate currently impacted areas and restore both the structural and functional components of the ecosystem. The Recommended Plan is expected to result in significant benefits to the aquatic ecosystem from the headwaters to Monday Creek's confluence with the Hocking River.

The Recommended Plan includes the following features:

Table 4. Plan Combination 6.

Plan	Location	Description
A	Jobs Hollow	1 doser, 3 SLB* and 1 OLC*
B	Dixie Run	1 SLB, 2 OLC and 1 LLB*
C	Rock Run	3 LHD* and 1 wetland
D	Lost Run	30 sites + 16 spoil blocks and 12 subsidences features
F	Monkey Hollow	1 doser + 9 spoil blocks and 6 subsidences features
H	Snake Hollow	1 SLB, 4 OLC and 4 LLB
J	Snow Fork	6 SLB, 19 OLC, 20 LLB, 8 dissipating streams, 9 spoil blocks, 7 subsidences, and 2 wetlands
L	Coe Hollow	2 SLB, 1 OLC, 4 LLB, 3 dissipating streams and 1 Subsidence feature

*SLB = slag leach bed; LLB = limestone leach bed; OLC = open limestone channel; LHD = low head dam

Currently, the project consists of 178 total restoration structures located within the following eight subwatersheds locations: Jobs Hollow, Dixie Hollow, Rock Run, Monkey Hollow, Lost Run, Snake Hollow, Coe Hollow, and Snow Fork (which is comprised of Salem Hollow, Sycamore Hollow, Spencer Hollow, Brush Fork, Long Hollow, Whitmore Cemetery and the Village of Orbiston).

Proposed structures and measures designed to reduce acid mine drainage pollutant levels include: open limestone channels, low head dams, limestone leach beds, slag leach beds, aerobic wetlands and dosers. Other forms of construction activities involve the closure of stream-capturing subsidences (depressions), rerouting dissipating, or disappearing, streams and breaching or removing spoil piles that block the natural drainage patterns.

Plan Benefits

The Recommended Plan (RP), Plan Combination 6, will restore 230.20 acres of aquatic stream habitat by greatly reducing acidity loadings and toxic metal concentrations, thereby improving water quality conditions to areas that were once uninhabitable. Baseline conditions indicated that some structural and functional components of the aquatic system exist, but were missing water quality conditions conducive to a viable aquatic ecosystem. The project will reduce the iron and aluminum concentrations and acidity levels that are acutely toxic to the aquatic biological community. Project implementation will improve the benthic habitat and lead to subsequent recolonization by fish species. Diversity and abundance of benthic species

will increase both laterally and longitudinally over time. Eventually, higher order aquatic and terrestrial organisms will return.

Monitoring and Adaptive Management

The long-term monitoring plan will consist of chemical and biologic monitoring along the mainstem of Monday Creek and Snow Fork at existing monitoring sites and also the establishment of new sites on tributaries. The baseline dataset is robust with historic data from several sources dating to 1997. In addition, Ohio EPA's Total Maximum Daily Load (TMDL) monitoring sites are tied to these locations. The OEPA data includes water chemistry, sediment analysis, biological sampling (fish and macroinvertebrates) and stream flow.

Monitoring of water chemistry will be conducted in tributaries proposed for reclamation projects. This effort will be confined temporally to pre- and post-construction projects for a period of five years.

e. Project cost estimates. The Monday Creek Environmental Restoration project cost is $17,720,000 (based on the October 2004 price level). Project costs summarized by Feature Account are shown in Table 3. The fully funded estimate is $18,737,000 (including prior expenses) based on construction distribution between FY07 and FY10 with some monitoring costs extending into FY14. The Federal discount rate used was 5.625 percent. A 10 percent contingency was assigned using the cost engineer's judgment based upon the amount of risk and uncertainty.

2. Alternative Formulation Briefing Comments

General Comment. HQUSACE requests that CELRH provide additional information on the following topics for review and approval prior to the release of the draft feasibility report.

- The District must demonstrate why the Corps should undertake this project, given that 82% of the sites are located on lands owned by the U.S. Forest Service (see HQUSACE Assessment, item 2.c.3). The fact that the USFS does not have funds to implement the 5-year plan for the Wayne National Forest is not a valid argument for the Corps to take the lead on this project. At present, the Corps has authority to study the project area, but does not have authority to implement any ecosystem restoration measures.

District Response: In accordance with the MOU to Foster the Ecosystem Approach of 30 September 1999 (Appendix A of EP 1165-2-502) signed between 14 executive branch entities including the Department of Army and the Department of Agriculture, "The Federal government should provide leadership in and cooperate with activities that foster the ecosystem approach to natural resource management, protection, and assistance. Federal agencies should ensure that they utilize their authorities in a way that facilitates, and does not pose barriers to, the ecosystem approach. Consistent with their assigned missions, federal agencies should administer their programs…. and should work with them to achieve common goals." "The purposes are to eliminate inefficiencies and duplication of effort ..." and "Each signatory agency shall participate, as appropriate to its mandates, in ecosystem management efforts initiated by other federal agencies…" Also, "This in this Memorandum of Understanding in no way restricts the Cooperators from participating in similar activities or arrangements with other public or private agencies, organizations, or individuals." With the above information, it is noted that the Corps does have an ecosystem mission, whereas, the US Forest Service does not. The Forest Service does not anticipate appropriations to be able to construct a $19 million project but has agreed to participate in the OMRRR of the project features on government property. The District recognizes that at this time, we to not have authority to construct the project, however, we feel that this should not hinder the process of the feasibility study nor its recommendations.

HQUSACE Assessment: <u>The issue is resolved</u>.

- The future without-project condition should be updated to include an analysis of future logging and coal mining effects on the Monday Creek watershed.

District Response: Concur. The FWOP Condition will be updated to include an analysis of future logging and coal mining effects on the watershed.

HQUSACE Assessment: The issue is resolved. The requested information has been included in the draft feasibility report.

- The CE/ICA should be recalculated using the updated future without-project conditions, updated real estate costs (see item 2.b.1), habitat quality factors (as discussed in items 2.c.10 and 2.c.12), and average annual costs (as discussed in item 2.b.2). The results of this analysis should be graphically displayed, as required in section C-3.e.(8)a.(7), page C-19, of ER 1105-2-100.

District Response: Concur. The CE/ICA was recalculated with FWOP Conditions, Updated RE costs, habitat Quality Factors and Average annual costs. The results will be graphically displayed. It should be noted that the above reference (C-3.e. (8)a.(7)), refers to mitigation requirements for ecological resources and not Ecosystem Restoration Projects. Please refer to the attached CE/ICA appendix.

HQUSACE Assessment: The issue is resolved. The requested information has been included in the draft feasibility report.

- The significance of the proposed habitat improvements has not been discussed in the materials provided, as discussed in paragraph 16.b of EP 1165-2-502. The relative importance of the habitats that would be restored by this project must be addressed in accordance with the cited policy guidance.

District Response: Concur. The report will discuss the significance of the proposed habitat improvements with regards to the institutional, public and/or technical importance. In addition, the significance will be discussed in terms of differences between estimated future without- and with- plan conditions. Also, the report will discuss the acceptability, completeness, effectiveness and efficiency of the plans.

HQUSACE Assessment: The issue is resolved. The requested information has been included in the draft feasibility report.

Specific Comments

a. Study Background

1. Project description. Providing a brief description of the items that are required for completion of this section (location, problems, key assumptions, and base conditions) would greatly facilitate the review process. It is important to discuss the relationship of the U.S. Forest Service, and its properties, to this project.

District Response: Concur. The relationship with the U.S. Forest Service, and the location and key assumptions of this project to their lands has been incorporated into the report.

HQUSACE Assessment: The issue is resolved. The requested information has been included in the draft feasibility report.

2. Future without-project conditions must be provided. Without some indication of what will happen in the future, it is impossible to determine the benefits of any of the proposed alternatives. For example, what if in the future without project condition, the water quality of all of these systems improves without any input from man? What is the expected future-without project condition with regard to the USFS 5-year plan to remediate these areas?

District Response: Concur. The future without-project Conditions have been developed and have been incorporated into the report. The water quality improvement could happen without any input from man, however, it would probably not occur for hundreds, if not thousands, of years. The future without project conditions with regard to the USFS 5 year plan has been incorporated into the document.

HQUSACE Assessment: The issue is resolved. The requested information has been included in the draft feasibility report.

b. Alternative Plans

1. The real estate cost estimates are not included in the evaluation of alternatives. In order to effectively evaluate alternatives, a gross real estate estimate, at the minimum, must be included in the evaluation. Without real estate costs, it is impossible to effectively conduct the cost effectiveness incremental cost analysis for selection of a recommended plan.

District Response: Concur. A gross real estate cost estimate was being developed at the time the AFB material went to press. The gross real estate cost estimate of $67,000 has been provided and will be included in the evaluation. Forty (40) parcels will need to have long-term easements since a MOU will be developed for those sites located on U.S. Forest Service lands, therefore, RE costs do not have a significant effect on the analyses.

Discussion: The RE gross appraisal costs were included in the cost estimate and used during the annualization of costs for use in the CE/ICA. The RE gross appraisal will be included in the feasibility document. A copy of the CE/ICA is included for your review; however, existing guidance does not require review and approval at this stage of project development from HQ prior to release of the report. The document will be reviewed by a Regional Technical Specialist for technical competency prior to release of the report.

HQUSACE Assessment: The issue is resolved. The requested information has been included in the draft feasibility report.

2. Incremental analysis needs to use average annual costs rather than first costs, as acknowledged in the text.

District Response: Concur. Average Annual Costs have been developed and have been used in the Incremental Analysis.

HQUSACE Assessment: The issue is resolved. The requested information has been included in the draft feasibility report.

c. Other Policy Issues

1. It appears that the AMD in this project is the single environmental insult impacting the Monday Creek ecosystem. Are there any existing regulatory mandates for the study area to be remediated by the project sponsor to meet water quality standards?

District Response: No. There are not any existing regulatory mandates for the study area to be remediated by the project sponsor. These sites were the consequences of mining operations in the early part of the 19th and 20th centuries.

HQUSACE Assessment: The draft report should include a complete and concise discussion of regulatory mandates for the project area. Specifically, this discussion should demonstrate no regulatory requirements are in place that would require other parties (such as the mine operators, the U.S. Forest Service, other Federal and State agencies, etc.) to remediate the acid mine drainage in the project area.

District Response: Concur. The following information will be incorporated into the report.

> The Wayne National Forest does not have a Federal mandate or mission to clean up the Acid Mine Drainage (AMD) on the Wayne National Forest. They receive monies each year to perform maintenance activities in the Forest. They use this money to fix trails, maintain comfort stations, and install treatments for AMD. In addition, Wayne National Forest personnel did perform a Potentially Responsible Party (PRP) search for the former mining companies under CERCLA, but was unable to identify any current companies, which could be held liable for the clean up of the streams.
>
> Congress has designated the Department of the Interior's Office of Surface Mining as the Federal authority responsible for addressing coal mining "contamination" problems such as acid mine drainage/acid rock drainage. However, OSM does not perform these duties but have delegated to the State to perform the work in Ohio. The ODNR receives its AML funding from OSM .
>
> USEPA's Abandon Mine Lands (AML) program defines AML as those lands, waters, and surrounding watershed contaminated or scarred by extraction, benefaction or processing of ores and minerals including uranium, copper, iron, lead, and zinc, phosphate but not coal.

Coal mining properties may be applicable to EPA's Brownfields Cleanup and Redevelopment due to the abandoned strip mines, mining building and processing facilities. This program also includes watersheds and water quality fixes.

EPA may, under the Non-Point Source (NPS) Program, improve and protect habitat through a mixture of water quality and/or technology based programs; regulatory and/or non-regulatory programs by providing financial, technical, and educational assistance. However, this program typically focuses on groundwater issues.

The Corps history of involvement in AMD restoration mission includes the following

- EPA & DOD HTRW Cleanup, 1980
- Coal Mine Restoration in the 1990s
- Water Resources Act of 1996
- Penn Mine, CA cost-sharing, 1997
- Restoration of Abandoned Mine Sites Program (RAMS) Support for Other Agencies, 1998
- WRDA 1999 & 2000
- Appropriations 2001, 2004
- General Investigation Authorities
- Section 560 Abandoned Non-Coal Mine Restoration
- CAP – Section 206, Section 1135, Section 22
- Beneficial Use of Dredge Material, Section 204
- Specific Restoration Projects, Sections 539, 502, and 595
- Brownsfields Projects

HQUSACE Assessment: The issue is resolved. The requested information has been included in the draft feasibility report.

2. This project appears to have a single focus of improving water quality with the additional benefit of restoring the aquatic ecosystem. "While measures to improve water quality parameters may be included in projects with an ecosystem restoration component, the ecosystem restoration portion of these projects should not principally result in treating or otherwise abating pollution or other compliance responsibility" (ER 1105-2-100, page 2-13). This project must include restoration measures to improve other components of the ecosystem.

District Response: There is not a pollution or compliance responsibility existing in the basin. There are many important components of an ecosystem including light, current, substrate, temperature, and chemical factors. Among chemical factors, oxygen, alkalinity, and nutrients are some of the most important. The streams in Monday Creek have very low oxygen content and low alkalinity due to AMD. The proposed restoration alternatives are designed to increase both oxygen and alkalinity and remove the metal loadings of the system. When looking at the physical structure of the Monday Creek Watershed, the shape and steepness and pools are sufficient for primary functions of photosynthesis and oxygenation. Smaller order streams such as those in the Monday

Creek watershed generally derive their organic inputs from terrestrial and riparian sources rather than through in-stream production. The riparian corridor is extensive due in part to the rural setting of the watershed and capable of providing food sources into the ecosystem. By improving the components of alkalinity and oxygen and removing the metals, the macroinvertebrates will repopulate the system, thus bringing higher order organisms into the system such as fish and other invertebrates. The terrestrial animals that utilize the aquatic system for food sources will also return, enabling the cycling of organic material between the terrestrial and aquatic ecological components to become reestablished. Therefore, improving the water quality is a critical component to restoring the ecosystem.

HQUSACE Assessment: The issue is resolved. Information has been included in the draft feasibility report emphasizing the necessity to improve water quality as an essential step in restoring the habitat quality and aquatic values of the streams in the project area, as explained above.

3. The location of many of these restoration measures is unclear, but it does appear some may be on U.S. Forest Service land. Is the Forest Service a cooperating agency? Does the Forest Service have a restoration mission? If so, that agency, not the Corps, must be responsible for managing and restoring it own lands using their authorities and funding.

District Response: Concur. Of the 202 sites, 177 are on Forest Service land. The Wayne National Forest is a cooperating agency. The U.S. Forest Services does not have a restoration mission. However, the Wayne National Forest has identified in their 5-year plan, as funding allows, measures to address the AMD issues in the watershed. However, funding for these projects within the Wayne National Forest is limited, such that their efforts are only piece-mealed throughout the Forest Service property boundaries. Please refer to the response below**.**

HQUSACE Assessment: HQUSACE requests additional clarification concerning this issue.

> **District Response:** The District believes the Corps should have the lead on this project because it is the only involved agency with an ecosystem restoration mission. The Corps has not studied or proposed addressing AMD sites only. The Corps has focused on a watershed-level ecosystem restoration project, considering the influence of physical, chemical and biological factors in the health of the system. The Corps has formulated ecosystem solutions that account for the connectedness of resources and synergistic ecosystem effects with objectives tied to faunal measures of performance. This project does not in any way provide assistance to the US Forest Service and its missions such as tree cutting, access road maintenance, or trail maintenance etc. This project is to provide aquatic ecosystem restoration within the Monday Creek watershed. (Also see response to General Comment #1).

HQUSACE Assessment: The issue is resolved. HQUSACE recommends that additional language be added to the report stressing that the benefits of this project will

accrue to the general public, and will not be restricted to the USFS or a small number of landowners.

4. Will the doser restoration measure be used to establish a sustainable ecosystem? How long is the measure anticipated to be in use?

District Response: The doser is an "active" restoration measure that is being recommended at 2 sites since the cost is less than constructing several passive alternatives; however, it has a more intensive O&M feature than the other recommended alternatives. The cost share partner understands the responsibility of the O&MRR required for this type of alternative. Service life of a doser is 20 years.

HQUSACE Assessment: The issue requires further clarification. The report should clarify how long the doser systems will remain in service, i.e., throughout the entire period of analysis, or just a portion of the period of analysis. The report should also describe the service life a doser, and whether they would need to be replaced over the period of analysis.

District Response: The service life of a doser was a misuse of wording on the author's part. The project life is 20 years. All project features and alternatives were designed to coincide with the project life. The doser will remain in service for the life of the project and probably years after that. Maintenance schedules of dosers are well documented. The information will be incorporated into the OMRRR manual and the report.

HQUSACE Assessment: The additional information provided addresses the HQ concern. The issue is resolved.

5. The information presented in section 6.1 is not accurate. Only General Investigations Feasibility Study costs are cost shared at 50% Federal and 50% nonfederal. Cost sharing for the construction of ecosystem restoration projects is 65% Federal and 35% nonfederal.

District Response: Concur. The text has been changed to reflect the cost sharing requirements during construction of 65% Federal and 35% non-federal.

HQUSACE Assessment: The issue is resolved. The requested information has been included in the draft feasibility report.

6. Status of Resource Agency Coordination**.** What is the specific status of resource agency coordination? For example, has a FWS Planning Aid Letter been acquired and has the FWS participated in the formulation of this project; has the SHPO been contacted regarding the potential impacts of any of the alternative to existing cultural resource sites?

District Response: Since 2000, the Monday Creek Team has met with state and Federal agencies on a bi-monthly basis. Resource agency coordination has occurred during the

last 4 years of the study phase of the project. The FWS Planning Aid Letter has been acquired and will be placed in the report appendices. The SHPO has been contacted and our Environmental Analysis staffs, as well as the USFS archeological staff, are working toward minimizing impacts to cultural resource sites that may be affected during construction. Besides Federal agencies, the team has partnered with the Ohio Environmental Protection Agency concerning the Section 401 water quality certification.

HQUSACE Assessment: The issue is resolved. The requested information has been included in the draft feasibility report.

7. Identification of Environmental Mitigation Requirement. Ecosystem restoration projects should be designed to avoid the need for fish and wildlife mitigation (ER 1105-2-100, p 3-24). Compliance with the Endangered Species Act is required (ibid, p 2-16) and should be reflected in the design to avoid significant negative impacts**.**

District Response: Concur. In coordination with the USFWS and the Wayne National Forest biological teams, the Corps team is minimizing impacts to fish and wildlife resources such that compensatory mitigation should not be needed. In addition, the Corps is working with the USFWS and several other partners to avoid impacts to Federally listed Threatened or Endangered Species. The most impact of the project would occur through the construction of roads to the restoration sites. However, we have partnered closely with the USFS to locate and utilize existing roads. We have adopted USFS road design and construction policies and practices. We are adhering to the tree cutting requirements, in accordance with the Biological Opinion (USFWS document) for the Wayne National Forest for all alternative sites.

HQUSACE Assessment: *The issue is not resolved*. With regard to the need for compensatory mitigation, the District must be able to demonstrate that any adverse effects that remain after all practicable avoidance and minimization measures have been implemented do not reach the level of significance, and therefore, do not require mitigation (i.e., the District must be able to demonstrate that the various impacts associated with all necessary road building, tree cutting and clearing for treatment measures required to implement the project are insignificant, both individually and cumulatively). With regard to compliance with the Endangered Species Act, the existing biological opinion applies only to the Wayne National Forest. The proposed project area includes sites outside of the Wayne National Forest, and presumably, these sites are not covered by the existing biological opinion. Consultation under section 7 of the ESA may be needed for the project; the District should contact the USFWS to determine the need for such consultation, and this information should be included in the draft report.

District Response: The District has been working with the USFWS for 4 years on this project and has received a planning aid letter. Neither the USFWS nor the District anticipates adverse impact to the endangered species listed in the area. Consultation under Section 7 is not required and our actions will not reach the level of significance, and therefore, does not require compensatory mitigation. The construction activities will be disturbing less than 0.1% of 1% of Indiana Bat habitat and the Corps has concurrence

from the USFWS that the action "is not likely to adversely affect" the listed species in the project area. Therefore, Section 7 consultation is not needed for this project. Also, this information will be conveyed in the feasibility study**.**

HQUSACE Assessment: The additional information provided by the district addresses the HQ concern. The issue is resolved

8. Section 2.1.1 Existing Land Use.

A. The percentages of land owned and managed by the Wayne National Forest and the Sunday Creek Coal Company in the Monday Creek watershed should be checked for consistency. Section 2.1.1 of the report states that the Wayne National Forest (WNF) owns 48% of the watershed. Later in the same paragraph, it is stated that Sunday Creek Coal Company owns 8.5% of the watershed. Farther down in this paragraph it is stated that the combined ownership of WNF and Sunday Creek Coal is 48%. Section 1.4 of the report, Prior Studies and Reports, contains a study summary noting that the Wayne National Forest comprises 40.1 percent of the Monday Creek Watershed.

District Response: Concur. The USFS owns 40% of the land in the watershed and Sunday Creek Coal Company owns 8.5%. Each section of the text has been changed to reflect this.

HQUSACE Assessment: The issue is resolved. The requested information has been included in the draft feasibility report.

B. The report states that approximately 5 percent of the land cover in the Monday Creek watershed is "current" surface mines. In the context of this section, it is not clear if the term "current" means active or inactive mining operations, or both. It is recommended that more descriptive terms be substituted for purposes of clarity, such as active, inactive, abandoned, etc.

District Response: Concur. There are a few active mining operations in the watershed. The text will be changed to clarify this.

HQUSACE Assessment: The issue of more descriptive terms to characterize coal mining in the project area is resolved. In addition, given that the District has clarified that active coal mining is taking place in the project area, the effects of such mining should be discussed in the future without-project condition analysis in the feasibility study and the cumulative effects discussion of the NEPA document.

District Response: Concur. The effects of coal mining will be discussed in the FWPC and FWOPC and also in the CE discussions.

HQUSACE Assessment: The issue is resolved. The requested information has been included in the draft feasibility report.

C. The report states that logging operations may be taking place in parts of the watershed. The draft report should address the effects of logging on the project area, especially the likelihood that any ongoing or future logging would disrupt measures implemented by this project, or accelerate the release of acid from sites that are not contributing significant amounts of acid to the watershed at this time. The discussion should specifically address whether ongoing or future logging would have the potential to "undo" some of the benefits of this project. A logical place for this discussion is cumulative effects section of the NEPA document. This comment is formulated mainly with respect to, but not limited to, new logging roads and the potential increases in erosion that could occur due to logging operations (e.g., removing trees and other vegetative cover from steep slopes, erosion caused by tree skidders, and rutting caused by heavy equipment).

District Response: Concur. The issues of logging in the watershed will be addressed in the Cumulative Effects section of the Environmental Assessment.

HQUSACE Assessment: The issue is resolved. An analysis of the effects of future logging has been included in the future without-project condition of the feasibility report and in the cumulative effects discussion of the NEPA document.

9. Section 2.1.2 Historic Land Use. The report states that there are no current coal mining operations (surface or subsurface) in the Monday Creek watershed. In the context of this section, the term "current" appears to mean an active mining operation. It is recommended that a more descriptive term be substituted for purposes of clarity**.**

District Response: Concur.

HQUSACE Assessment. The issue is resolved. The requested information has been included in the draft feasibility report.

10. Section 3.0 Project Goals.

A. The graphic on page 28 illustrates the range of potential ecosystem health conditions under consideration, but confuses the project goal (restoring to a less degraded state) with a specific target (chosen as WWH). This has fundamental implications for project formulation, since plans must be formulated for a range of restoration levels to identify the plan that reasonably maximizes net ecosystem benefits, no just to meet a pre-selected target.

District Response: Concur. The project goal is to restore the aquatic ecosystem to a less degraded state. The model, developed by WVU, developed alternatives that should meet the WWH requirements and would maximize net ecosystem benefits.

HQUSACE Assessment: *The issue is not resolved*. The Corps' analysis, incorporating the CE/ICA process, should identify the plan that reasonably maximizes net ecosystem

benefits (i.e., the NER plan). The above response appears to indicate that project is being designed to a specific target level. Clarification of the District's response is required.

District Response: Concur. The aquatic ecosystem of the Monday Creek watershed was found to offer structural, trophic and certain water quality parameters (i.e., temperature) of WWH. The aquatic ecosystem has a threshold of pH, alkalinity, and other parameters in this region to which species diversity and numbers of individuals would be expected to be present. The aquatic conditions above this threshold will also coincide with a less degraded state. Below this threshold the system would not be sustainable.

The District found two effective alternatives from the ecosystem perspective; restore a habitable threshold of pH, alkalinity and certain metals or no action. This, in turn, offers WWH and no action as the alternative ecosystem options. The District formulated and evaluated plans based on the only practical array; methods and geographic extent. The report will be modified to clarify the relationship.

The TAMDL computer model was used to design of the alternatives to ensure efficiency of alkalinity production from each alternative so that sustainability objectives were met. The Cost Effectiveness/Incremental Cost Analysis maximizes the net ecosystem benefits with respect to cost to these alternatives.

HQUSACE Assessment: The issue is resolved. The requested information has been included in the draft feasibility report.

B. There are two distinct aspects to the formulation issue: the extent of restoration in terms of how many river reaches (which has been addressed); and the extent of restoration in terms of a range of habitat quality which needs to be varied to demonstrate that the right level of restoration has been recommended.

District Response: Concur. The formulation has been expanded to reflect the range in habitat quality of the aquatic system.

HQUSACE Assessment: *The issue is not resolved*. This response requires further clarification to explain how habitat quality will be incorporated into the plan formulation process, such as through recalculation of the CE/ICA or other means.

District Response: Recalculation of the habitat quality was performed and was analyzed using the IWR-Plan. This information has been incorporated into the report.

HQUSACE Assessment: The issue is resolved. The revised habitat calculations have been included in the draft feasibility report.

C. Metrics: Page 29 has two tables that identify existing ICI scores by river reach, and the target ICI score for WWH. The fourth column is erroneously identified as habitat units, when it simply represents the difference in score between existing and target ICI score. Habitat Units are typically derived through a HEP process, and represent acreage

with an index quality. This specific term of HU's should not be applied to the metrics here.

District Response: Concur. The table header has been modified to reflect the difference in existing and target ICI scores. All references to HU have been removed from the document. The text has been changed to reflect the acreage of the system to be altered by the project. For example, river miles multiplied by average width will be used to represent the area affected by the project.

HQUSACE Assessment: The issue is resolved.

11. Section 4.2 Ecosystem Approach.
A. The final paragraph on p 32 discusses parameters of the chemical habitat necessary for the desired species to exist. How are the problems of "precipitation of compounds that cover the natural substrate" (page 3, paragraph 3) addressed by the various formulated measures? Both the existing conditions and potential additional precipitates from various treatment alternatives will affect the success of recovery. This aspect of "completeness" needs to be addressed more clearly to demonstrate the likely success of the restoration toward a more natural system.

District Response: Concur. The problems of "precipitation of compounds that cover the natural substrate" have been taken into account when formulating the alternatives. In the instance of a Limestone Leach Bed (LLB) and Open Limestone Channel (OLC) measure, the LLB removes the harmful acidity without raising the pH significantly. Then the OLC raises the pH enough to allow iron to precipitate. This iron is captured in the OLC. Where needed, wetlands are to be constructed to avoid precipitation of the flocculants into the system. This will be addressed in the text to clarify the proposed measures will not do the system harm.

HQUSACE Assessment: The response requires further clarification. The above response appears to state that the LLBs and OLC will neutralize any new acid entering the system, and would precipitate and trap any iron entering the system. It appears that this solution treats only the new acid and iron inputs to the system. It is unclear whether the proposed treatment methods will do anything to improve existing downstream areas that may be adversely affected by precipitated compounds that cover the natural substrate of the stream.

District Response: The projects do treat new acid generated and iron compounds. The missing component in the Monday Creek aquatic ecosystem is the water quality. The streams in Monday Creek have very low oxygen content and low alkalinity due to AMD. The proposed restoration alternatives are designed to increase both oxygen and alkalinity and remove the metal loadings of the system. By addressing these components with the projects, improvements will occur downstream due to flushing.

HQUSACE Assessment: The issue is resolved. The requested information has been included in the draft feasibility report.

B. Are the water quality measures proposed in the plan capable of restoring the aquatic habitat in the project area?

District Response: According to the raw scores reflected during the baseline conditions investigations, structural and functional components of the aquatic system exist. The missing attribute is that the chemistry of the water that is deficient. Elevated iron and aluminum exist in concentrations that are acutely toxic to the aquatic biological community. Acidity levels in some stretches of the streams are equal to vinegar. The proposed water quality measures will restore the natural water chemistry of the area, restore the productivity of the benthos, and allow the stream to be re-colonized by fish and benthic species located downstream of the project site. Species diversity and abundance will increase both laterally and longitudinally over time. In addition, once the benthos populations has increased, higher order aquatic and terrestrial organisms will return, enabling the cycling of organic material between the terrestrial and aquatic ecological components to become reestablished.

HQUSACE Assessment: The issue is resolved. The requested information has been included in the draft feasibility report.

C. Also, if the various treatment methods differ in their effect on important habitat conditions, these should be made clear, possibly in the descriptions offered on pp 35-39.

District Response: Each restoration method has specific functions that have been applied on a site-by-site basis. By looking at the flow, acidity, pH, iron, and aluminum concentrations, each sub watershed has been designed to meet the thresholds developed by the OEPA in the West Virginia University Total Acid Mine Drainage Loading (WVU-TAMDL) Model.

HQUSACE Assessment: *The issue is not resolved*. The response does not indicate that the above information would be incorporated into the draft report, and in addition, the response suggests that the restoration thresholds would be based solely upon the WVU-TAMDL model, and would not be determined through the CE/ICA process, as required by ER 1105-2-100.

District Response: CE/ICA determines which projects are the most cost effective. It's not clear why a team would use CE/ICA to design the project feature. Perhaps this is a terminology issue and not a study process issue.

The thresholds were determined by OEPA for restoration of the water quality parameters that are missing from the ecosystem (also refer to response in 11.B by the district). The aquatic ecosystem has a threshold of pH, alkalinity, and other parameters in this region to which species diversity and numbers of individuals would be expected to be present. The aquatic conditions above this threshold will also coincide with a less degraded state. Below this threshold the system would not be sustainable. The TAMDL model was used to design of the alternatives to ensure efficiency of alkalinity production from each

alternative so that sustainability objectives were met. The CE/ICA maximizes the net ecosystem benefits with respect to cost to these alternatives.

This information has been incorporated into the draft document.

HQUSACE Assessment: The issue is resolved. The requested information has been included in the draft feasibility report.

D. Remediation thresholds (page 33) represent a specific target (see comment on Project Goals 3.0). The text in sections 4.2.1 (p 34) and 4.2.4 (p 35) suggest a desirable PH range from 6.0 to 7.5. Plans formulated to restore habitat within this range would show how costs vary with the improved habitat in these ranges, and could be used to demonstrate the plan that gives the greatest restoration compared to its costs. However, it is the habitat response, not just the PH and other chemical parameters as indicators, which ultimately must be represented. The habitat response metric needs to reflect both quantity and quality of the habitat restored.

District Response: Habitat Response Metric will include the number of fish (quantity), types of fish (diversity), and types of macroinvertebrates (diversity) that will be monitored by both OEPA and the cost-share partner.

HQUSACE Assessment: The issue is resolved. The draft report includes the habitat metrics described in the above response.

12. Section 4.5 Alternatives Considered in Detail

A. River Miles restored is a useful statistic, but does not necessarily correlate to the amount of habitat restored – varied widths, different characteristics, connectivity etc. The latter is ultimately what the project accomplishes.

District Response: Concur. We have added the component of width using cross section information (averaged for each subwatershed) to facilitate the assessment of habitat restored.

Our sustainability metric utilized for the incremental analysis and cost effectiveness in the IWR-Plan includes the following:

Sustainability = Quantity x Quality x Importance = Score

Plan	Quantity (Acres)	Quality (ICI Score)	Importance*	Score
FWOPC	120	20	1	240
Plan A FWPC	20	35	2	1400
Plan B FWPC	50	32	3	4800

*Importance is measured by the following ranking
1 = No connectivity except within subwatershed
2 = Connectivity with the mainstem Monday Creek only

3 = Connectivity of headwaters of subwatershed with mainstem of Monday Creek

HQUSACE Assessment: The issue is resolved. The requested information has been included in the draft feasibility report.

B. A potential shortcoming of using river miles as the habitat metric is that is may be skewing the incremental analysis (as presented). The analysis (p 49) shows incremental costs increasing as downstream features are added. This might seem counterintuitive, especially considering the "trickle down" effects mentioned. (Conversely, if introduction of pollutants is more intense downstream, this could explain the difference). Is it possible that the downstream miles have greater stream width and depth (and thus represent more habitat) so the unit costs might not be as high as represented in the table?

District Response: Concur. This is a possibility. We are modifying the metric to reflect acreage instead of miles restored.

HQUSACE Assessment: The issue is resolved. The requested information has been included in the draft feasibility report.

C. Is the connectivity of the latter increments attributed to those actions? The problems with the representation of habitat quantity and quality need to be resolved so the incremental analysis will adequately display variations in restoration output (across a range of quality conditions) versus costs.

District Response: Concur.

HQUSACE Assessment: *The issue is not resolved*- the response does not describe what actions the District would take to answer the question.

District Response: The connectivity of the actions could be responsible for the increasing costs; however, we reversed the logic within the IWR-Plan to look at a bottom up approach. The bottom up plan came up with the same Best Buy Plan since the mainstem sustainability units are dependent on the previous action. However, the costs were similar since the same plans were recommended in the Best Buy Plan. This information has been discussed in the feasibility study.

HQUSACE Assessment: The issue is resolved. The requested clarification has been included in the draft feasibility report.

D. Additionally, in this instance they only represent restoration to one level of quality, represented by the target. Plans must be formulated to various levels of quality. The text indicates that some plans that did not meet the target have already been formulated, so for these the work is already done and merely needs to be presented.

District Response: Concur. The text has been modified to reflect the plans that have been formulated that did not meet the target. We have titled the headings to reflect Initial Screening, Intermediate Screening, and Final Screening of Alternatives. Also, more

detail is given in text concerning the screening criteria and why each alternative was retained for or removed from consideration.

HQUSACE Assessment: The issue is resolved. The requested information has been included in the draft feasibility report.

13. Section 6.1, Local Cooperation and Cost Sharing. The first paragraph of Section 6.1 of the report appears to confuse the cost-sharing requirements for project studies and project construction, and should be clarified. Section 203(a)(1)(A) of 1999 WRDA states that non-Federal interests shall contribute 50% of project study costs. Section 206(b) of 1999 WRDA states that the non-Federal interest shall provide 35% of the construction costs for aquatic ecosystem restoration projects.

District Response: Concur. The text will be changed accordingly.

HQUSACE Assessment: The issue is resolved. The requested information has been included in the draft feasibility report.

14. Justification for the recommended plan. HQUSACE believes that additional analysis is needed to support and justify the choice of the recommended plan (Alternative 6), and the rationale for excluding plans 2, 3, 4 and 5 from further consideration (see pages 64 and 65, section 4.7). The selection of Alternative 6 seems reasonable from an outputs/cost relationship, i.e., breaks in the CE/ICA curve, but the reasons for dismissing the other alternatives is not clear. Section 4.7 says only that Alternative 6:

- has the greatest increase in output for the least increase in cost, and that PCs 2, 3, 4, 5 and 7 were not the most efficient in production for the least increases in cost, as compared to Plan Combination 6
- PC 6 has the greatest net benefits and in accordance with Corps guidance is the NER plan.

These statements do not appear to make sense. Alternatives 2-5 are all inherently more efficient than Alternative 6, as evidenced by the lower incremental costs per unit of output. Also, the report is not clear on what is meant by the term "greatest net benefits". The District may have identified an appropriate plan, but the justification in the report must be explicit in demonstrating why this is the proper plan to select, touching on subjects such as completeness, effectiveness, and cost-effectiveness. It is important to note that the audience for this report will not be familiar with Corps guidance, and therefore, it will not be apparent why this plan is consistent with Corps guidance, and is thus the "best" plan to select. HQUSACE requests that the District provide additional discussion supporting the choice of Alternative 6 as the NER plan.

District Response: Chapter 4 of the report has been revised to provide additional information supporting the choice of Alternative 6 as the tentatively recommended plan. Additional information has been included discussing the reasons for not selecting Alternatives 2 through 5 as the recommended plan, and explaining why the extra outputs

represented by Alternative 7 were not worth the extra increment of cost. As explained in Section 4.7 and later sections, Alternative 6 satisfies the project objectives, and achieves the restoration of approximately 98% of the stream channels in the Monday Creek watershed.

HQUSACE Assessment: The issue is resolved. The revisions made to Chapter 4 have adequately justified the choice of Alternative 6 as the tentatively recommended plan.

15. Miscellaneous editorial changes

A. IWR PLAN does not determine the recommended plan; it is merely a tool to provide information to the team (page 48, final paragraph).

District Response: Concur. The PDT will utilize the IWR-plan for informational purposes. The text will be changed to reflect this.

HQUSACE Assessment: The issue is resolved. The requested information has been included in the draft feasibility report.

B. The units presented in the evaluation are contradictory: the table on page 49 lists ICI and H.U.s, while the graphic presents cost versus miles. This needs to be clarified in the evaluation, as well as in the report.

District Response: Concur. The units will be made uniform throughout the text. See comment 10.

HQUSACE Assessment: The issue is resolved. The requested information has been included in the draft feasibility report.

C. Subsidence (page 50). The subsidence measures will affect the alternatives above and will change the CE/ICA.

District Response: Concur. The subsidence measures were being delineated at the time of the AFB materials printing.

HQUSACE Assessment: *The issue is not resolved*- the District should explain that the above information will be incorporated into the draft report, and included in the recalculation of the CE/ICA, as requested by HQUSACE.

District Response: The subsidence measures were included in the recalculation of the CE/ICA. The information has been incorporated into the report.

HQUSACE Assessment: The issue is resolved. The requested information has been included in the draft feasibility report.

D. The draft report should include a map that depicts the boundaries of the Wayne National Forest.

District Response: Concur. A map depicting the WNF will be included in the report.

HQUSACE Assessment: The issue is resolved. The requested information has been included in the draft feasibility report.

3 Additional Comment from Final Report

A. Executive Summary, Page 7**.** This page has a short paragraph stating that the Corps would perform work on the Wayne National Forest property as Work for Others. HQUSACE was under the impression that the local sponsor intended to pursue separate authorization for this work through the Water Resources Development Act

District Response: For the report/project to be policy compliant, the Corps has to state that the work on the Wayne National Forest will be performed as work for others. If the sponsor does indeed pursue and get separate authorization that would be acceptable. However, until the separate authorization occurs, this is the way the Corps will precede with the project.

HQUSACE Assessment: This issue is resolved based on the explanation and clarification provided by the district.